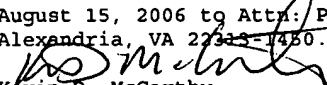


Express Mail Certificate

I hereby confirm that I, Kevin D., McCarthy, have deposited this correspondence along with other documents with the U.S. Postal Service by express mail with appropriate postage on August 15, 2006 to Attn: PCT Legal Administration, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450. The express mail label number is EE 272891452 US.


Kevin D. McCarthy
Date August 15, 2006

Patent 0-05-165/16015/US/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Fishler
Serial no.: 10/552,377
Inter. Filed: April 8, 2004
Title: SOLID BIOCIDES FORMULATIONS
Examiner: N/A
Art Unit: N/A

Attn: PCT Legal Administration
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

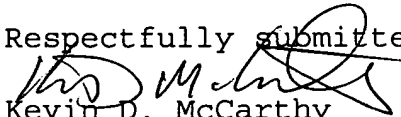
Dear Sir/Madam:

INFORMATION DISCLOSURE STATEMENT

Applicant submits the enclosed information disclosure statement that is being filed prior to the first office action. Accordingly, it is applicant's opinion that the examiner at the U.S. Patent and Trademark Office should consider these references in determining the patentability of this application.

If Applicant becomes aware of other relevant references that are not cumulative of the submitted references, Applicant will submit them.

Respectfully submitted


Kevin D. McCarthy

Reg. No. 35,278

Roach, Brown, McCarthy & Gruber, P.C.
1620 Liberty Building - 420 Main Street
Buffalo, New York 14202

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

| | | | |
|--|------|---------------------------------|---------------|
| Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i> | | Complete if Known | |
| | | Application Number | 10/552,377 |
| | | Filing Date | April 8, 2004 |
| | | First Named Inventor | Fishler |
| | | Art Unit | N/A |
| | | Examiner Name | N/A |
| Sheet 1 | of 1 | Attorney Docket Number 0-05-165 | |

| NON PATENT LITERATURE DOCUMENTS | | | |
|---------------------------------|-----------------------|---|----------------|
| Examiner Initials* | Cite No. ¹ | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published. | T ² |
| | | International Preliminary Report on Patentability for corresponding PCT application - 5 pages | |
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|--------------------|--|-----------------|--|
| Examiner Signature | | Date Considered | |
|--------------------|--|-----------------|--|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

| | | | |
|--|--|--|------------------|
| Applicant's or agent's file reference 16015-WO-03 | FOR FURTHER ACTION | | See item 4 below |
| International application No. PCT/IL2004/000317 | International filing date (<i>day/month/year</i>) 08 April 2004 (08.04.2004) | Priority date (<i>day/month/year</i>) 14 April 2003 (14.04.2003) | |
| International Patent Classification (IPC) or national classification and IPC A01N 59/08, 25/00, 43/50, 43/66 | | | |
| Applicant BROMINE COMPOUNDS LTD. | | | |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------------|---|---|-----------|---------------------|--------------------------|------------|----------|-------------------------------------|-------------|--|--------------------------|------------|----------------------------|-------------------------------------|-----------|---|--------------------------|------------|-------------------------|--------------------------|-------------|--|--------------------------|--------------|---|
| 1. | This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a). | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. | This REPORT consists of a total of 5 sheets, including this cover sheet. In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead. | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. | <p>This report contains indications relating to the following items:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 10%; text-align: center;"><input checked="" type="checkbox"/></td> <td style="width: 30%;">Box No. I</td> <td style="width: 60%;">Basis of the report</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> | <input checked="" type="checkbox"/> | Box No. I | Basis of the report | <input type="checkbox"/> | Box No. II | Priority | <input checked="" type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | <input type="checkbox"/> | Box No. IV | Lack of unity of invention | <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | <input type="checkbox"/> | Box No. VI | Certain documents cited | <input type="checkbox"/> | Box No. VII | Certain defects in the international application | <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. II | Priority | | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention | | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. VI | Certain documents cited | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application | | | | | | | | | | | | | | | | | | | | | | | |
| 4. | The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2). | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | |
|---|---|---|---|--------------------------------|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 740 14 35 | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Date of issuance of this report 14 October 2005 (14.10.2005)</td> </tr> <tr> <td style="padding: 2px;">Authorized officer Simin Baharlou</td> </tr> <tr> <td style="padding: 2px;">Telephone No. +41 22 338 71 30</td> </tr> </table> | Date of issuance of this report 14 October 2005 (14.10.2005) | Authorized officer Simin Baharlou | Telephone No. +41 22 338 71 30 |
| Date of issuance of this report 14 October 2005 (14.10.2005) | | | | |
| Authorized officer Simin Baharlou | | | | |
| Telephone No. +41 22 338 71 30 | | | | |

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITYTJA
KIFR LUZZATTO
P.O. BOX 5352
BEER SHEVA, ISRAEL 84152

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

| | | |
|--|--|--|
| Applicant's or agent's file reference | | Date of mailing (day/month/year) 23 DEC 2004 |
| 16015-WO-03 | | FOR FURTHER ACTION See paragraph 2 below |
| International application No. | International filing date (day/month/year) | Priority date (day/month/year) |
| PCT/IL04/00317 | 08 April 2004 (08.04.2004) | 14 April 2003 (14.04.2003) |
| International Patent Classification (IPC) or both national classification and IPC | | |
| IPC(7): A01N 59/08, 25/00, 43/50, 43/66 and US Cl.: 424/665; 514/241, 385, 386, 769, 770 | | |
| Applicant | | |
| BROMINE COMPOUNDS LTD. | | |

CORRECTED
VERSION

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

| | |
|--|---|
| Name and mailing address of the ISA/ US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230 | Authorized officer Gary Kunz Telephone No. (571) 272-1600 |
|--|---|

DEBORAH A. THOMAS
PARALEGAL SPECIALIST
~~GROUP 1800~~ put

Form PCT/ISA/237 (cover sheet) (January 2004)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/IL04/00317

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application

☒ claims Nos. 21,22,24 and 25

because:

☒ the said international application, or the said claim Nos. 21 and 22 relate to the following subject matter which does not require an international preliminary examination (*specify*):

Claims 21 and 22 are directed to "Use" claims which are not proper process claims under 35 USC 101.

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 21,22,24,25 are so unclear that no meaningful opinion could be formed (*specify*):

Claims 21, 22 are indefinite in that they merely recite a use without any active, positive steps delimiting how the use is actually practiced. Claims 24, 25 are indefinite in that they fail to point out what is included or excluded by the claim language

☐ the claims, or said claims Nos. _____ are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for said claims Nos. _____

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐

has not been furnished

☐

does not comply with the standard

the computer readable form

☐

has not been furnished

☐

does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

☐ See Supplemental Box for further details.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IL04/00317

Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|------------------------------|-----|
| Novelty (N) | Claims <u>8-18 and 23</u> | YES |
| | Claims <u>1-7, 19 and 20</u> | NO |
| Inventive step (IS) | Claims <u>NONE</u> | YES |
| | Claims <u>1-20 and 23</u> | NO |
| Industrial applicability (IA) | Claims <u>1-20, 23</u> | YES |
| | Claims <u>NONE</u> | NO |

2. Citations and explanations:

Claims 8-18, 23 meet the criteria set out in PCT Article 33(2) because no single prior art reference explicitly discloses the use of boron and/or silicate compounds or the non-combustion of the product.

Claims 1-20, 23 meet the criteria set out in PCT Article 33(4), and thus industrial applicability because the subject matter claimed can be made or used in industry.

Claims 1-7, 19, 20 lack novelty under PCT Article 33(2) as being anticipated by Olson (US Pat. 4,731,195).
Olson explicitly discloses an encapsulated particle containing a chlorine-releasing substance, including calcium hypochlorite, trichlorocyanuric acid where the coating is heated and contains borates and silicates (Column 4, lines 17-68, Column 5).

Claims 1-20, 23 lack an inventive step under PCT Article 33(3) as being obvious over Olson (US Pat. 4,731,195) in view of Jones et al. (US Pat. 5,478,482).

Olson discloses an encapsulated particle containing a chlorine-releasing substance, including calcium hypochlorite, trichlorocyanuric acid where the coating is heated and contains borates and silicates (see entire reference, especially, column 4, lines 17-68, column 5).

Jones et al. discloses that the use of boron compounds and clarifying materials such as chlorine compounds, such as calcium hypochlorite and trichloro-s-triazinetriene, and aluminum sulfate, improves control of algae and other microorganisms and that the same can be in the form of tablet or other solid form (Column 3, lines 30-68, Columns 4-6). It is disclosed that the compositions are non-oxidizers in that they do not combust (Columns 7-11).

The difference between the prior art and the claimed invention is that the prior art does not expressly disclose the use of boron and/or silicate compounds or non-combustion of the product. However, it would have been well within the skill of and one of ordinary skill in the art would have been motivated to modify the prior art as above with the expectation that heating the combination of boron compounds and silicates would result in the formation of an encapsulated chlorine-releasing compound which would be non-combustible.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/IL04/00317

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐ a sequence listing

☐ table(s) related to the sequence listing

b. format of material

☐ in written format

☐ in computer readable form

c. time of filing/furnishing

☐ contained in international application as filed.

☐ filed together with the international application in computer readable form.

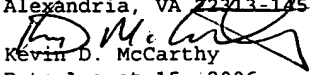
☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Express Mail Certificate

I hereby confirm that I, Kevin D., McCarthy, have deposited this correspondence along with other documents with the U.S. Postal Service by express mail with appropriate postage on August 15, 2006 to Attn: PCT Legal Administration, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450. The express mail label number is EE 272891452 US.


Kevin D. McCarthy
Date August 15, 2006

Patent 0-05-165/16015/US/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Fishler
Serial no.: 10/552,377
Inter. Filed: April 8, 2004
Title: SOLID BIOCIDES FORMULATIONS
Examiner: N/A
Art Unit: N/A

Attn: PCT Legal Administration
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

PETITION UNDER 37 CFR § 1.181

1. On August 14, 2006, we received a document entitled "Notification of Abandonment" that was mailed on August 8, 2006 and was from John L. Anderson. (See Exhibit A.) Mr. Anderson wrote, "Applicant has failed to provide the full U.S. Basic National Fee by 30 months (37 CFR 1.495(b)(2)). Therefore, the above identified application failed to meet the requirements of 35 U.S.C. 371 and 37 CFR 1.495, and is ABANDONED AS TO THE UNITED STATES OF AMERICA." The applicant respectfully traverses that abandonment.

2. Applicant contend the above-identified application is not in fact abandoned, and through this petition under 37 CFR § 1.181(a) requests withdrawal of the holding of abandonment as the appropriate course of action. This petition is being filed within the two (2) months of the mail date of the Notice of Abandonment.

3. A complete copy of the application as filed on October 7, 2005 is attached as Exhibit B. The filed application included a transmittal letter (3 pages), International Application (A2) (10 pages); International Application (A3) (4 pages); a clean documents (13 pages); Amendments to Claims (11 pages); an unsigned declaration (2 pages); Information Disclosure Statement (6 pages); Assignment documents (2 pages);

Preliminary Amendment (5 pages); Form 304 (1 page); Form 308 (1 page); PCT Request (4 pages); a self-addressed, stamped postcard; an express mail label (ER 573628078 US) and a check for \$690.

4. The self-addressed, stamped postcard identifies the filed application included a transmittal letter (3 pages), International Application (A2) (10 pages); International Application (A3) (4 pages); a clean documents (13 pages); Amendments to Claims (11 pages); an unsigned declaration (2 pages); Information Disclosure Statement (6 pages); Assignment documents (2 pages); Preliminary Amendment (5 pages); Form 304 (1 page); Form 308 (1 page); PCT Request (4 pages); a self-addressed, stamped postcard; and a check for \$690.

5. The express mail label identifies that the application was sent to "Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" and it was mailed on October 7, 2005 – US postal service barrel stamp and the written "date in" date.

6. The preliminary amendment document and the Information Disclosure Statement both contained Express Mail Certificates that confirmed Exhibit B was being transmitted to the USPTO through the US postal service's express mail system with express mail label number ER 573628078 US.

7. On October 31, 2005, we received a returned postcard (Exhibit C with an e-mail to the client about receiving the postcard and requesting the inventors execute the declaration) that confirmed the USPTO received the application, determined the filing date was October 7, 2005, and accorded the application serial number 10/552,377. We were able to determine that information because the returned postcard has additional writing thereon. That additional writing is as follows:

JCO6 Rec'd PCT/PTO 07 OCT 2005

10/552377

There was nothing else written on the returned postcard. In particular, no where on the returned postcard does it indicate that the fees were not paid.

8. On November 29, 2005, we received the executed declaration and informed the client that we would file the declaration upon receipt of the Notice of Missing Requirements. See Exhibit D. We have never received the Notice of Missing Requirements.

9. On March 2, 2006, we submitted a second information disclosure statement.

10. Prior to August 14, 2006, we never received a Notice of Missing Requirements or any document from the USPTO that indicated there were insufficient funds submitted or no check submitted with the application. The returned postcard, the express mail

certificates, and the attached Exhibits illustrate that the USPTO received the check for \$690.

11. It should be noted that the check for \$690 (check number 18054) has never been cashed. Since the check is more than 120 days old, our accountant will not place a stop order on the check.

12. A credit card payment (form 2038) for \$690 is attached. It is respectfully requested that the USPTO use that payment for the U.S. Basic National Fee, the Examination Fee, the Search Fee, the Claim Fee and the Assignment Fee that was originally submitted to the USPTO on October 7, 2005 and received by the USPTO as confirmed by the returned postcard.

13. We also enclose a second credit card payment (form 2038) for \$130 for submission of the executed declaration.

14. We also enclose a third information disclosure statement with the International Preliminary Report on Patentability.

15. It is respectfully requested that in view of the facts set forth above that the above-identified application is not in fact abandoned, and through this petition under 37 CFR § 1.181(a) requests withdrawal of the holding of abandonment as the appropriate course of action.

16. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity or the application or any patent issued thereon.

Respectfully submitted



Kevin D. McCarthy

Reg. No. 35,278

Roach, Brown, McCarthy & Gruber, P.C.
1620 Liberty Building - 420 Main Street
Buffalo, New York 14202



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| | | |
|-----------------------------|-----------------------|------------------|
| U.S. APPLICATION NUMBER NO. | FIRST NAMED APPLICANT | ATTY. DOCKET NO. |
| 10/552,377 | Theodor Morel Fishler | 0-05-165 |

| | |
|-------------------------------|---------------|
| INTERNATIONAL APPLICATION NO. | |
| PCT/IL04/00317 | |
| I.A. FILING DATE | PRIORITY DATE |
| 04/08/2004 | 04/14/2003 |

Kevin D McCarthy
Roach Brown McCarthy & Gruber
420 Main Street
1620 Liberty Building
Buffalo, NY 14202

CONFIRMATION NO. 9287

371
ABANDONMENT/TERMINATION
LETTER



OC000000019943073

Date Mailed: 08/08/2006

NOTIFICATION OF ABANDONMENT

The United States Patent and Trademark Office in its capacity as a Designated / Elected Office (37 CFR 1.495) has made the following determination:

- Applicant has failed to provide the full U.S. Basic National Fee by 30 months (37 CFR 1.495(b)(2)).

*- Did not receive
Notice of Missing Requirements
- called 8/14/06 upon receipt of this
notice
- Not on PAIR*

Therefore, the above identified application failed to meet the requirements of 35 U.S.C. 371 and 37 CFR 1.495, and is ABANDONED AS TO THE UNITED STATES OF AMERICA.

JOHN L ANDERSON

Telephone: (703) 308-9140 EXT 211

PART 3 - OFFICE COPY

FORM PCT/DO/EO/909 (371 Abandonment Notice)

Customer Copy
Label 11-B September 2002



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| Weight lbs. ozs. | Int'l Alpha Country Code | COD Fee |
| No Delivery <input type="checkbox"/> Weekend <input type="checkbox"/> Holiday | Acceptance Clerk Initials 11.2 | Total Postage & Fees \$ 13.65 |

FROM: (PLEASE PRINT)

PHONE ()

Kevin D. McCarthy
Roach Brown McCarthy & Gruber, P.C.
1620 Liberty Building
420 Main Street
Buffalo, NY 14202

FOR PICKUP OR TRACKING CALL 1-800-222-1811

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| Delivery Date | Time | Employee Signature |
| Mo. Day | <input type="checkbox"/> AM <input type="checkbox"/> PM | |

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PTO-1390 (Rev. 07-2005)

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| | | |
|---|--|--|
| TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371 | | ATTORNEY'S DOCKET NUMBER 0-05-165 |
| | | U.S. APPLICATION NO. (If known, see 37 CFR 1.5) N/A |
| INTERNATIONAL APPLICATION NO. PCT/IL2004/000317 | INTERNATIONAL FILING DATE April 8, 2004 | PRIORITY DATE CLAIMED April 14, 2003 |
| TITLE OF INVENTION Solid Biocide Formulations | | |
| APPLICANT(S) FOR DO/EO/US Fishler | | |
| Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information: | | |
| 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a submission under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a submission under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below. 4. <input checked="" type="checkbox"/> The US has been elected (Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) a. <input checked="" type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). -A2-document-10 pages A3-document-4 pages Clean document-13 pages b. <input type="checkbox"/> has been communicated by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)). a. <input type="checkbox"/> is attached hereto. b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4). 7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) a. <input checked="" type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). -11 pages-identified as "marked-up page" b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). -unsigned-2 pages 10. <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). Items 11 to 20 below concern document(s) or information included: 11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. -6 pages 12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. -2 pages 13. <input checked="" type="checkbox"/> A preliminary amendment. -5 pages 14. <input type="checkbox"/> An Application Data Sheet under 37 CFR 1.76. 15. <input type="checkbox"/> A substitute specification. 16. <input type="checkbox"/> A power of attorney and/or change of address letter. 17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 37 CFR 1.821- 1.825. 18. <input type="checkbox"/> A second copy of the published International Application under 35 U.S.C. 154(d)(4). 19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4). | | |

This collection of information is required by 37 CFR 1.414 and 1.491-1.492. The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 15 minutes to complete, including gathering information, preparing, and submitting the completed form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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| | | | | | |
|---|--------------|---|---------|-----------------------------|----|
| U.S. APPLICATION NO. (if known, see 37 CFR 1.5) | | INTERNATIONAL APPLICATION NO. | | ATTORNEY'S DOCKET NUMBER | |
| N/A | | PCT/IL2004/000317 | | 0-05-165 | |
| 20. Other items or information: Form 304 (1 page); Form 308 (1 page); PCT Request (4 pages); Return postcard, Check for \$690 | | | | | |
| The following fees have been submitted | | | | CALCULATIONS - PTO USE ONLY | |
| 21. <input checked="" type="checkbox"/> Basic national fee (37 CFR 1.492(a))..... \$300 | | | | \$ 300 | |
| 22. <input checked="" type="checkbox"/> Examination fee (37 CFR 1.492(c)) | | | | | |
| If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... \$0 | | | | \$ 200 | |
| All other situations..... \$200 | | | | | |
| 23. <input checked="" type="checkbox"/> Search fee (37 CFR 1.492(b)) | | | | | |
| If the written opinion of the ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... \$0 | | | | \$ 100 | |
| Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority..... \$100 | | | | | |
| International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB..... \$400 | | | | | |
| All other situations..... \$500 | | | | | |
| TOTAL OF 21, 22 and 23 = | | | | 500 | |
| <input type="checkbox"/> Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing in compliance with 37 CFR 1.821(c) or (e) or computer program listing in an electronic medium) (37 CFR 1.492(j)). The fee is \$250 for each additional 50 sheets of paper or fraction thereof. | | | | | |
| Total Sheets | Extra Sheets | Number of each additional 50 or fraction thereof (round up to a whole number) | RATE | | |
| 13 - 100 = | 0 / 50 = | 0 | x \$250 | \$ 0 | |
| Surcharge of \$130.00 for furnishing any of the search fee, examination fee, or the oath or declaration after the date of commencement of the national stage (37 CFR 1.492(h)). | | | | \$ 0 | |
| CLAIMS | NUMBER FILED | NUMBER EXTRA | RATE | \$ | |
| Total claims | 23 - 20 = | 3 | x \$ 50 | \$ 150 | |
| Independent claims | 3 - 3 = | 0 | x \$200 | \$ 0 | |
| MULTIPLE DEPENDENT CLAIM(S) (if applicable) | | | + \$360 | \$ 0 | |
| TOTAL OF ABOVE CALCULATIONS = | | | | \$ 650 | |
| <input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. Fees above are reduced by 1/2. | | | | 0 | |
| SUBTOTAL = | | | | \$ 650 | |
| Processing fee of \$130.00 for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i)). | | | | \$ 0 | |
| TOTAL NATIONAL FEE = | | | | \$ 650 | |
| Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property | | | | \$ 40 | |
| TOTAL FEES ENCLOSED = | | | | \$ 690 | |
| | | | | Amount to be refunded: | \$ |
| | | | | Amount to be charged | \$ |

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- a. ☒ A check in the amount of \$ 690 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.
- c. ☐ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. _____. A duplicate copy of this sheet is enclosed.
- d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the International Application to pending status.

SEND ALL CORRESPONDENCE TO:

Kevin D. McCarthy
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420 Main Street
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SIGNATURE

Kevin D. McCarthy

NAME

35,278

REGISTRATION NUMBER

SOLID BIOCIDES FORMULATIONS

Field of the Invention

The invention relates to new compositions of biocidals, particularly oxidants such as TCCA (trichloro-isocyanuric acid) in the form of granulates and tablets, which have reduced oxidative potential while said efficiency as biocides is not impaired in any way.

Background of the Invention

TCCA is the basic material for a large class of household and industrial products used for treating the water of swimming pools, cooling towers, toilet bowls, detergents, paper industry, and the like. It is sold as tablets of various forms and sizes or as granulated material or powder.

TCCA is a powerful oxidant and as such its transportation and shipping is regulated by rules, varying from country to country, regarding packaging requirements. The packages should bear a warning label showing the oxidant characteristics and should be constructed so that any contact of their contents with organic or oxidizable matter is avoided. For the USA these rules are elaborated by the Department of Transportation (DOT). The packaging requirements are described in the Code of Federal Regulations (CFR), Title 49, Transportation, Parts 100-185 (Revised as of Oct. 1, 2000), §173.127(1), "Class 5, Division 5-1 - Definition and Assignment of Packing Groups". The classification of packages is done according to the results of a testing procedure described by the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Section 34, Test O.1 "Test for Oxidizing Solids" (hereinafter, "the UN test"). To the applicant's best knowledge, prior

art TCCA formulations that comply with these stringent requirements and do not require the "oxidant" labeling are not available on the market and have not been disclosed. Some formulations have been disclosed that were claimed to pass the old DOT test (hereinafter "the DOT test") for ignitability. Said test, described in Appendix F (now abandoned) to Part 173 made a comparison between the burning time of standard mixtures that used saw dust as combustible matter and a mixture of potassium bromate and potassium perchlorate as reference oxidizing material and 4:1 and 1:1 mixtures of the oxidizer to be tested with the same saw dust. Saw dust is not a well defined combustible material and contains lignin, a phenolic constituent of the wood, whose combustibility is low. This allows longer burning times of the standards and more possibility of the tested material to pass the test. However, the DOT test was abandoned and replaced with the UN test, so that the fact that a formulation passes the DOT test is not significant. The main difference between the UN test and the DOT test is that the first uses as combustible material dry, micronized cellulose fibers, well characterized by the particle size and moisture content, and uses potassium bromate alone as reference oxidant. In some cases, compositions that would not pass said test are allowed to be marketed without a warning labeling because they are limited to small packages (less than 1 kg., Package Group III).

US 6,068,791 describes formulations containing 72-72.1% TCCA, 2.9-3.2% glycoluril, 18% Alum, 6.8% Borax and 0.1% Boric acid that are stated (but not claimed) to be able to pass the DOT test for comburancy. These mixtures contain relatively low levels of TCCA, which are not as efficient for water treatment or cleaning applications.

US patents 5,478,482, 5,670,059 and 5,514,287 describe mixtures of 60% sodium-dichloro-s-triazinetriene (Na dichloro-isocyanurate) with 20-30% Na persulfate, 10% Na tetraborate, 0-10% aluminum sulfate and 0-20% oxone, that apparently are non-comburant by the DOT test (though this again is stated but not claimed). These compositions contain ca 36% available chlorine only, so that it could be expected that, at this level, the oxidative properties would not be significant.

It is clear, therefore, that no TCCA composition is known in the art that has high biocidal properties, and yet is non-comburant according to the UN test, is less dangerous for transport and storage than the known compositions, and does not require special labeling. It is the purpose of this invention to provide such a composition.

It is another purpose of this invention to provide such compositions that contain other oxidant biocides in general.

A further purpose is the provision of biocide tablets for the sanitation of bodies of water.

Other purposes and advantages of the invention will appear as the description proceeds.

Summary of the Invention

The composition of the invention comprises mixtures of an active component that is a biocide, particularly is an oxidant and more particularly is TCCA, with a combination of inorganic compounds capable of forming a low-melting glass when heated by being ignited or subjected to a heating source, such as a fire. Preferably, the low-melting glass is formed when the composition is heated to moderately

high temperatures, which may be, for instance, from 300 to 800°C. The glass covers the mixture thus decreasing its oxidant capacity. A preferred example of said combination of inorganic compounds is the combination of boron compounds and silicates. Boric acid is a suitable boric compound, but can be substituted by the same molar amounts (viz. by the same boric moiety) of borates, such as sodium tetraborate or borax. Silicates should preferably be such that their ratio $\text{SiO}_2/\text{Na}_2\text{O}$ is between 2 and 5 and should preferably have a Na_2O content between 12-25 wt%, as is e.g. the case of sodium silicates (known as powdered water glass). This mixture forms, on heating, the low melting borosilicate glass that protects the biocide from contact with the surrounding, rendering it non-dangerous in case of accidental fire

Preferred contents of boric acid, or amounts of boric moieties in borates, are from 2 to 15 wt% and preferably from 10 to 15 wt% of the whole composition. Preferred contents of the silicate are from 1 to 10 wt% and preferably from 2 to 8 wt% of the whole composition.

According to an embodiment of the invention, the compositions may also contain a flocculant, for example, but not only, alum (hydrated or anhydrous, sulfate of aluminum). This is desirable, for easing the removal of precipitates that may be generated in the application of the mixture.

The invention also relates to the formation of tablets, briquettes, pucks and granules based on the above compositions; and to the use of said compositions, particularly said tablets, for the sanitation of bodies of water such as swimming pools, spas, cooling towers, paper industry wastes, toilet bowls; as well as to the use of said

compositions for household bleaches, and for industrial and institutional (I&I) bleaches applications, and others. The major embodiment of the present invention is a novel approach for introduction of fire-retardancy into biocide applications. It is apparent to a person skilled in the art that the active materials could be included in various multi-component compositions, for example in mixtures that include an additional algicide.

It will be understood that the invention in its broadest aspect provides means for causing biocide compositions, having oxidant properties, less comburant, viz. less liable to enhance burning of combustible materials. Therefore it is not limited to compositions in which the main active material is TCCA but extends to compositions in which the main active material is another oxidant biocide, or a biocide that is not an oxidant. Examples of such active materials are the sodium salt of dichloro-isocyanuric acid, calcium hypochlorite, dihalo-dialkylhydantoins (where dihalo means dibromo-, dichloro- or bromochloro-, dialkyl means C1-C5 aliphatic hydrocarbon radical, which can be the same or different), and other halogenated isocyanurates, e.g. dichloro or monochloro acids or their salts.

Detailed Description of Preferred Embodiments

Examples of compositions according to embodiments of the invention wherein TCCA (trichloro-isocyanuric acid) is the biocide, the boric compound is BA (boric acid), and the silicate is SS (sodium silicate with a $\text{SiO}_2/\text{Na}_2\text{O}$ ratio of 3.22), which also comprise Alum as flocculant, are given in Table I.

Table I

| Mixture # | Parts by weight | | | |
|-----------|-----------------|----|----|------|
| | TCCA | BA | SS | Alum |
| 1 | 90 | 8 | 5 | 10 |
| 2 | 90 | 8 | 5 | 5 |
| 3 | 90 | 8 | 2 | 10 |
| 6 | 90 | 5 | 5 | 5 |
| 7 | 90 | 5 | 2 | 10 |
| 8 | 90 | 5 | 2 | 5 |
| 9 | 80 | 8 | 5 | 10 |
| 10 | 80 | 8 | 5 | 5 |
| 12 | 80 | 8 | 2 | 5 |
| 13 | 80 | 5 | 5 | 10 |
| 15 | 80 | 5 | 2 | 10 |
| 16 | 100 | | | |

Table II presents the results of testing of the mixtures of Table I:

Table II

| Sample # | Burning test results | | | | | | | | | |
|----------|----------------------|---------|---------|------------|----------|---------|---------|---------|------------|----------|
| | | | 1/1 | | | | | 4/1 | | |
| | Burning | Glowing | Smoking | Flickering | Duration | Burning | Glowing | Smoking | Flickering | Duration |
| 1 | | | <+ | + | 3' | | | ++ | | 1' 30" |
| 2 | | | + | | 2' 25" | | | ++ | + | 1' 15" |
| 3 | | | + | + | 2' 33" | | | ++ | | 1' 35" |
| 6 | | | + | + | 1' 6" | | | ++ | + | 1' 30" |
| 7 | | | ++ | + | 2' 10" | | | ++ | | 1' |
| 8 | | | ++ | + | 1' 30" | | | ++ | | 1' 20" |
| 9 | | | + | | 3' | | | ++ | | 1' 30" |
| 10 | | | ++ | + | 3' | | | ++ | | 1' 45" |
| 12 | | | + | | 3' | | | ++ | | 1' 15" |
| 13 | | | | + | 3' | | | ++ | | 50" |
| 15 | | | + | | 3' | | | ++ | | 1' 25" |
| 16 | ++ | | ++ | | 1' | | | ++ | + | 30" |

The + indicates a positive response. More than one + indicate stronger positive responses. A comparative mixture containing only TCCA burned with flame and a lot of smoke, while mixtures 1, 2 and 7 to 12

burned only for a short time. Mixtures 6, 13 and 15 do not burn or glow. All mixtures developed smoke, some flickered but none visibly glowed.

Similar mixtures of other biocidal materials, such as halogenated dialkylhydantoins, calcium hypochlorite and the sodium salt of dichloroisocyanuric acid, taken in equivalent active halogen proportions, behaved similarly.

The anti-microbial efficacy of the exemplified compositions was tested on *E. coli* #11229, according to a modified AOAC standard method 965.13—Efficacy for Swimming Pool Disinfection. A chlorine concentration of 0.5 ppm, provided by the formulations, was enough to kill the bacteria in less than 1 minute. TCCA alone was similarly active at said concentration. This shows that the efficacy of the compositions according to the invention was not affected by the presence of the components other than the oxidant.

The compositions can be granulated by a dry or wet process. The granules can be used directly or can be further pressed into bodies, e.g. tablets or briquettes of any desired form, of convenient sizes according to the intended use.

If a soluble sanitizing agent, e.g. Na dichloro-isocyanurate (NaDCCA), is used in the formulation, the compositions can be used, as granules or bodies, for shock treatment of any body of water requiring it, due to the high solubility of the biocide.

While some embodiments of the invention have been described by way of illustration, it will be apparent that the invention can be carried

into practice by persons skilled in the art with many modifications, variations and adaptations, without departing from the spirit of the invention or exceeding the scope of the claims.

CLAIMS

1. Biocidal compositions, containing biocidal components and mixed with said components a combination of inorganic compounds capable of reducing the oxidative capacity of the biocidal components by forming a low-melting glass when heated.
2. Biocidal composition according to claim 1, wherein the biocidal composition is heated by being ignited or subjected to a heating source.
3. Biocidal composition according to claim 2, wherein the heating source is a fire.
4. Biocidal composition according to claim 1, wherein the biocidal component is an oxidant.
5. Biocidal composition according to claim 4, wherein the oxidant is trichloroisocyanuric acid.
6. Biocidal composition according to claim 1, wherein the composition forms a low-melting glass when heated to moderately high temperatures.
7. Biocidal composition according to claim 6, wherein the moderately high temperatures are from 300 to 800°C.
8. Biocidal composition according to claim 1, wherein the combination of inorganic compounds is the combination of boric compounds and alkaline silicates.

9. Biocidal composition according to claim 8, wherein the boric compounds are chosen from among boric acid, borax and sodium tetraborate.
10. Biocidal composition according to claim 8, wherein the silicates are sodium silicates.
11. Biocidal composition according to claim 8, wherein the silicates are such that the ratio $\text{SiO}_2/\text{Na}_2\text{O}$ is between 2 and 5 and the Na_2O content is between 12-25%.
12. Biocidal composition according to claim 1, wherein the combination of inorganic compounds is such as to produce, when heated, a low-melting, borosilicate glass which coats the oxidant.
13. Biocidal composition according to claim 9, wherein the contents of boric acid or of the molar boric moieties of borates, are from 2 to 15 wt% of the whole composition.
14. Biocidal composition according to claim 13, wherein the contents of boric acid or of the molar boric moieties of borates, are from 10 to 15 wt% of the whole composition.
15. Biocidal composition according to claim 8, wherein the contents of the silicates are from 1 to 10 wt% of the composition.
16. Biocidal composition according to claim 15, wherein the contents of the silicates are from 2 to 8 wt% of the composition.

17. Biocidal composition according to claim 1, further comprising a flocculant.
18. Biocidal composition according to claim 17, wherein the flocculant is aluminum sulfate.
19. Biocidal composition according to claim 4, wherein the oxidant is chosen from the group consisting of trichloro-isocyanuric acid, calcium hypochlorite, dihalo-dialkyl-hydantoins, halogenated isocyanuric acids and the salts of said acids.
20. Biocidal solid composition according to claim 1, in the form of tablets, briquettes, granules or powder.
21. Use of the composition according to any one of claims 1 to 20 for the sanitation of bodies of water.
22. Use according to claim 21, wherein the bodies of water are chosen from the group consisting of swimming pools, spas, cooling towers, paper industry wastes, toilet bowls, household and I&I bleaches applications.
23. Method for rendering biocide compositions less comburant, which comprises mixing with the biocide a combination of inorganic compounds capable of forming a low-melting glass when heated to moderately high temperatures.
24. Biocidal composition, substantially as described and exemplified.

25. Method for rendering biocide compositions less comburant, substantially as described and exemplified.

Abstract

Biocidal compositions that contain biocidal components, such as an oxidant, and mixed with said components a combination of inorganic compounds capable of reducing the oxidative capacity of the biocidal components by forming a low-melting glass when heated. The biocidal composition may be heated by being ignited or subjected to a heating source, such as a fire.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: SOLID BIOCIDAL FORMULATIONS

(57) Abstract: Abstract Biocidal compositions that contain biocidal components, such as an oxidant, and mixed with said compo-
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SOLID BIOCIDES FORMULATIONS

Field of the Invention

The invention relates to new compositions of biocidals, particularly oxidants such as TCCA (Trichloro-isocyanuric acid) in the form of granulates and tablets, which have reduced oxidative potential while said efficiency as biocides is not impaired in any way.

Background of the Invention

TCCA is the basic material for a large class of household and industrial products used for treating the water of swimming pools, cooling towers, toilet bowls, detergents, paper industry, and the like. It is sold as tablets of various forms and sizes or as granulated material or powder.

TCCA is a powerful oxidant and as such its transportation and shipping is regulated by rules, varying from country to country, regarding packaging requirements. The packages should bear a warning label showing the oxidant characteristics and should be constructed so that any contact of their contents with organic or oxidizable matter is avoided. For the USA these rules are elaborated by the Department of Transportation (DOT). The packaging requirements are described in the Code of Federal Regulations (CFR), Title 49, Transportation, Parts 100-185 (Revised as of Oct. 1, 2000), §173.127(1), "Class 5, Division 5-1 - Definition and Assignment of Packing Groups". The classification of packages is done according to the results of a testing procedure described by the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Section 34, Test O.1 "Test for Oxidizing Solids" (hereinafter, "the UN test"). To the applicant's best knowledge, prior art TCCA formulations that comply with these stringent requirements and do not require the "oxidant" labeling are not available on the market and have

not been disclosed. Some formulations have been disclosed that were claimed to pass the old DOT test (hereinafter "the DOT test") for ignitability. Said test, described in Appendix F (now abandoned) to Part 173 made a comparison between the burning time of standard mixtures that used saw dust as combustible matter and a mixture of potassium bromate and potassium perchlorate as reference oxidizing material and 4:1 and 1:1 mixtures of the oxidizer to be tested with the same saw dust. Saw dust is not a well defined combustible material and contains lignine, a phenolic constituent of the wood, whose combustibility is low. This allows longer burning times of the standards and more possibility of the tested material to pass the test. However, the DOT test was abandoned and replaced with the UN test, so that the fact that a formulation passes the DOT test is not significant. The main difference between the UN test and the DOT test is that the first uses as combustible material dry, micronized cellulose fibers, well characterized by the particle size and moisture content, and uses potassium bromate alone as reference oxidant. In some cases, compositions that would not pass said test are allowed to be marketed without a warning labeling because they are limited to small packages (less than 1 Kg., Package Group III)

US 6,068,791 describes formulations containing 72-72.1% TCCA, 2.9-3.2% glycoluril, 18% Alum, 6.8% Borax and 0.1% Boric acid that is stated (but not claimed) would pass the DOT test for comburancy. These mixtures contain relatively low levels of TCCA, which are not as efficient for water treatment or cleaning applications.

US patents 5,478,482, 5,670,059 and 5,514,287 describe mixtures of 60% Sodium-dichloro-s-triazinetriene (Na dichloro-isocyanurate) with 20-30% Na persulfate, 10% Na tetraborate, 0-10% Aluminum sulfate and 0-20% oxone, that apparently are non-comburant by the DOT test (though this

again is stated but not claimed). These compositions contain ca. 36% available chlorine only, so that it could be expected that, at this level, the oxidative properties would not be significant.

It is clear, therefore, that no TCCA composition is known in the art that has high biocidal properties, and yet is non-comburant according to the UN test, is less dangerous for transport and storage than the known compositions, and does not require special labeling. It is the purpose of this invention to provide such a composition.

It is another purpose of this invention to provide such compositions that contain other oxidant biocides in general.

A further purpose is the provision of biocide tablets for the sanitation of bodies of water.

Other purposes and advantages of the invention will appear as the description proceeds.

Summary of the Invention

The composition of the invention comprises mixtures of an active component that is a biocide, particularly is an oxidant and more particularly is TCCA, with a combination of inorganic compounds capable of forming a low-melting glass when heated by being ignited or subjected to a heating source, such as a fire. Preferably, the low-melting glass is formed when the composition is heated to moderately high temperatures, which may be, for instance, from 300 to 800°C. The glass covers the mixture thus decreasing its oxidant capacity. A preferred example of said combination of inorganic compounds is the combination of boron compounds and silicates. Boric acid is a suitable

boric compound, but can be substituted by the same molar amounts (viz. by the same boric moiety) of borates, such as sodium tetraborate or borax. Silicates should preferably be such that their ratio $\text{SiO}_2/\text{Na}_2\text{O}$ is between 2 and 5 and should preferably have a Na_2O content between 12-25 wt%, as is e.g. the case of sodium silicates (known as powdered water glass). This mixture forms, on heating, the low melting borosilicate glass that protects the biocide from contact with the surrounding, rendering it non-dangerous in case of accidental fire.

Preferred contents of boric acid, or amounts of boric moieties in borates, are from 2 to 15 wt% and preferably from 10 to 15 wt% of the whole composition. Preferred contents of the silicate are from 1 to 10 wt% and preferably from 2 to 8 wt% of the whole composition.

According to an embodiment of the invention, the compositions may also contain a flocculant, for example, but not only, alum (hydrated or anhydrous, sulfate of aluminum). This is desirable, for easing the removal of precipitates that may be generated in the application of the mixture.

The invention also relates to the formation of tablets, briquettes, pucks and granules based on the above compositions; and to the use of said compositions, particularly said tablets, for the sanitation of bodies of water such as: swimming pools, spas, cooling towers, paper industry wastes, toilet bowls, household bleaches and others. The major embodiment of the present invention is a novel approach for introduction of fire-retardancy into biocide applications. It is apparent to a person skilled in the art that the active materials could be included in various multi-component compositions, for example in mixtures that include an additional algaecide.

It will be understood that the invention in its broadest aspect provides means for causing biocide compositions, having oxidant properties, less comburant, viz. less liable to enhance burning of combustible materials. Therefore it is not limited to compositions in which the main active material is TCCA but extends to compositions in which the main active material is another oxidant biocide, or a biocide that is not an oxidant. Examples of such active materials are the sodium salt of dichloro-isocyanuric acid, Calcium hypochlorite, dihalo-dialkyl-hydantoins (where dihalo means dibromo-, dichloro- or bromochloro-, dialkyl means C1-C5 aliphatic hydrocarbon radical, which can be the same or different), and other halogenated isocyanurates, e.g. dichloro or monochloro acids or their salts.

Detailed Description of Preferred Embodiments

Examples of compositions according to embodiments of the invention wherein TCCA (Trichloro-isocyanuric acid) is the biocide, the boric compound is BA (boric acid), and the silicate is SS (sodium silicate with a $\text{SiO}_2/\text{Na}_2\text{O}$ ratio of 3.22), which also comprise Alum as flocculant, are given in Table I.

Table I

| Mixture # | Parts by weight | | | |
|-----------|-----------------|----|----|------|
| | TCCA | BA | SS | Alum |
| 1 | 90 | 8 | 5 | 10 |
| 2 | 90 | 8 | 5 | 5 |
| 3 | 90 | 8 | 2 | 10 |
| 6 | 90 | 5 | 5 | 5 |
| 7 | 90 | 5 | 2 | 10 |
| 8 | 90 | 5 | 2 | 5 |
| 9 | 80 | 8 | 5 | 10 |
| 10 | 80 | 8 | 5 | 5 |
| 12 | 80 | 8 | 2 | 5 |
| 13 | 80 | 5 | 5 | 10 |
| 15 | 80 | 5 | 2 | 10 |

Table II presents the results of testing of the mixtures of Table I:

Table II

| Sample # | Burning test results | | | | | | | | | |
|----------|----------------------|---------|---------|------------|----------|---------|---------|---------|------------|----------|
| | | | 1/1 | | | | | 4/1 | | |
| | Burning | Glowing | Smoking | Flickering | Duration | Burning | Glowing | Smoking | Flickering | Duration |
| 1 | | | <+ | + | 3' | | | ++ | | 1' 30" |
| 2 | | | + | | 2' 25" | | | ++ | + | 1' 15" |
| 3 | | | + | + | 2' 33" | | | ++ | | 1' 35" |
| 6 | | | + | + | 1' 6" | | | ++ | + | 1' 30" |
| 7 | | | ++ | + | 2' 10" | | | ++ | | 1' |
| 8 | | | ++ | + | 1' 30" | | | ++ | | 1' 20" |
| 9 | | | + | | 3' | | | ++ | | 1' 30" |
| 10 | | | ++ | + | 3' | | | ++ | | 1' 45" |
| 12 | | | + | | 3' | | | ++ | | 1' 15" |
| 13 | | | | + | 3' | | | ++ | | 50" |
| 15 | | | + | | 3' | | | ++ | | 1' 25" |
| 16 | ++ | | ++ | | 1' | | | ++ | + | 30" |

The + indicates a positive response. More than one + indicate stronger positive responses. A comparative mixture containing only TCCA burned with flame and a lot of smoke, while mixtures 1, 2 and 7 to 12 burned only for a short time. Mixtures 6, 13 and 15 do not burn or glow. All mixtures developed smoke, some flickered but none visibly glowed.

Similar mixtures of other biocidal materials, such as halogenated dialkylhydantoins, calcium hypochlorite and the sodium salt of dichloroisocyanuric acid, taken in equivalent active halogen proportions, behaved similarly.

The anti-microbial efficacy of the exemplified compositions was tested on *E. coli* #11229, according to a modified AOAC standard method 965.13

Efficacy for Swimming Pool Disinfection. A chlorine concentration of 0.5 ppm, provided by the formulations, was enough to kill the bacteria in less than 1 minute. TCCA alone was similarly active at said concentration. This shows that the efficacy of the compositions according to the invention was not affected by the presence of the components other than the oxidant.

The compositions can be granulated by a dry or wet process. The granules can be used directly or can be further pressed into bodies, e.g. tablets or briquettes of any desired form, of convenient sizes according to the intended use.

If a soluble sanitizing agent, e.g. Na Dichloro-isocyanurate (NaDCCA), is used in the formulation, the compositions can be used, as granules or bodies, for shock treatment of any body of water requiring it, due to the high solubility of the biocide.

While some embodiments of the invention have been described by way of illustration, it will be apparent that the invention can be carried into practice by persons skilled in the art with many modifications, variations and adaptations, without departing from the spirit of the invention or exceeding the scope of the claims.

CLAIMS

1. Biocidal compositions, containing biocidal components and mixed with said components a combination of inorganic compounds capable of reducing the oxidative capacity of the biocidal components by forming a low-melting glass when heated.
2. Biocidal composition according to claim 1, wherein the biocidal composition is heated by being ignited or subjected to a heating source.
3. Biocidal composition according to claim 2, wherein the heating source is a fire.
4. Biocidal composition according to claim 1, wherein the biocidal component is an oxidant.
5. Biocidal composition according to claim 4, wherein the oxidant is Trichloroisocyanuric acid.
6. Biocidal composition according to claim 1, wherein the composition forms a low-melting glass when heated to moderately high temperatures.
7. Biocidal composition according to claim 6, wherein the moderately high temperatures are from 300 to 800°C.
8. Biocidal composition according to claim 1, wherein the combination of inorganic compounds is the combination of boric compounds and alkaline silicates.

9. Biocidal composition according to claim 8, wherein the boric compounds are chosen from among boric acid, borax and sodium tetraborate.

10. Biocidal composition according to claim 8, wherein the silicates are sodium silicates.

11. Biocidal composition according to claim 8, wherein the silicates are such that the ratio $\text{SiO}_2/\text{Na}_2\text{O}$ is between 2 and 5 and the Na_2O content is between 12-25%.

12. Biocidal composition according to claim 1, wherein the combination of inorganic compounds is such as to produce, when heated, a low-melting, borosilicate glass which coats the oxidant.

13. Biocidal composition according to claim 9, wherein the contents of boric acid or of the molar boric moieties of borates, are from 2 to 15 wt% of the whole composition.

14. Biocidal composition according to claim 13, wherein the contents of boric acid or of the molar boric moieties of borates, are from 10 to 15 wt% of the whole composition.

15. Biocidal composition according to claim 8, wherein the contents of the silicates are from 1 to 10 wt% of the composition.

16. Biocidal composition according to claim 15, wherein the contents of the silicates are from 2 to 8 wt% of the composition.

17. Biocidal composition according to claim 1, further comprising a flocculant.

18. Biocidal composition according to claim 17, wherein the flocculant is aluminum sulfate.

19. Biocidal composition according to claim 4, wherein the oxidant is chosen from the group consisting of trichloro-isocyanuric acid, calcium hypochlorite, dihalo-dialkyl-hydantoins, halogenated isocyanuric acids and the salts of said acids.

20. Biocidal solid composition according to claim 1, in the form of tablets, briquettes, granules or powder.

21. Use of the composition according to any one of claims 1 to 20 for the sanitation of bodies of water.

22. Use according to claim 21, wherein the bodies of water are chosen from the group consisting of swimming pools, spas, cooling towers, paper industry wastes, toilet bowls, household and I&I bleaches applications.

23. Method for rendering biocide compositions less comburant, which comprises mixing with the biocide a combination of inorganic compounds capable of forming a low-melting glass when heated to moderately high temperatures.

24. Biocidal composition, substantially as described and exemplified.

25. Method for rendering biocide compositions less comburant, substantially as described and exemplified.

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- (72) Inventor; and
- (75) Inventor/Applicant (for US only): FISHLER, Theodor Morel [IL/IL]; 20 Keren Ha'Yesod Street, 34970 Haifa (IL).
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL04/00317

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A01N 59/08, 25/00, 43/50, 43/66
US CL : 424/665; 514/241, 385, 386, 769, 770

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 424/665; 514/241, 385, 386, 769, 770

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | US 4,731,195 A (OLSON) 15 March 1988 (15.03.1988), see entire reference, especially column 4, lines 16-68, Column 5. | 1-16, 19, 20 |
| Y | | 17, 18, 23 |
| Y | US 5,478,482 A (JONES et al.) 26 December 1995 (26.12.1995), see entire reference especially column 3, lines 30-68, columns 4-11. | 17, 18, 23 |

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

| Special categories of cited documents: | |
|---|--|
| "A" document defining the general state of the art which is not considered to be of particular relevance | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
| "E" earlier application or patent published on or after the international filing date | "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "O" document referring to an oral disclosure, use, exhibition or other means | "&" document member of the same patent family |
| "P" document published prior to the international filing date but later than the priority date claimed | |

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DAT

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL04/00317

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 21 and 22
because they relate to subject matter not required to be searched by this Authority, namely:
"Use" claims are not proper process claims under 35 USC 101.
2. ☒ Claims Nos.: 21,22,24,25
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Please See Continuation Sheet
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL04/00317

Continuation of Box II Reason 2:

Claims 21, 22 are indefinite they merely recites a use without any active, positive steps delimiting how this use is actually practiced.
Claims 24, 25 are indefinite in that they fail to point out what is included or excluded by the claim language.

Continuation of B. FIELDS SEARCHED Item 3:

EAST

search terms: trichloroisocyanuric acid, hypochlorite, hydantoin, boric, borate, tetraborate, borosilicate, silicate, silica, silicon, glass, biocide, alum, aluminum sulfate

MARKED-UP PAGE

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Other purposes and advantages of the invention will appear as the description proceeds.

Summary of the Invention

The composition of the invention comprises mixtures of an active component that is a biocide, particularly is an oxidant and more particularly is TCCA, with a combination of inorganic compounds capable of forming a low-melting glass when heated by being ignited or subjected to a heating source, such as a fire. Preferably, the low-melting glass is formed when the composition is heated to moderately high temperatures, which may be, for instance, from 300 to 800°C. The glass covers the mixture thus decreasing its oxidant capacity. A preferred example of said combination of inorganic compounds is the combination of boron compounds and silicates. Boric acid is a suitable boric compound, but can be substituted by the same molar amounts (viz. by the same boric moiety) of borates, such as sodium tetraborate or borax. Silicates should

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preferably be such that their ratio $\text{SiO}_2/\text{Na}_2\text{O}$ is between 2 and 5 and should preferably have a Na_2O content between 12-25 wt%, as is e.g. the case of sodium silicates (known as powdered water glass). This mixture forms, on heating, the low melting borosilicate glass that protects the biocide from contact with the surrounding, rendering it non-dangerous in case of accidental fire

Preferred contents of boric acid, or amounts of boric moieties in borates, are from 2 to 15 wt% and preferably from 10 to 15 wt% of the whole composition. Preferred contents of the silicate are from 1 to 10 wt% and preferably from 2 to 8 wt% of the whole composition.

According to an embodiment of the invention, the compositions may also contain a flocculant, for example, but not only, alum (hydrated or anhydrous, sulfate of aluminum). This is desirable, for easing the removal of precipitates that may be generated in the application of the mixture.

The invention also relates to the formation of tablets, briquettes, pucks and granules based on the above compositions; and to the use of said compositions, particularly said tablets, for the sanitation of bodies of water such as: swimming pools, spas, cooling towers, paper industry wastes, toilet bowls, as well as to the use of said compositions for household bleaches, and for industrial and institutional (I&I) bleaches applications, and others. The major embodiment of the present invention is a novel approach for introduction of fire-retardancy into biocide applications. It is apparent to a person skilled in the art that the active materials could be included in various multi-component compositions, for example in mixtures that include an additional algicide.

It will be understood that the invention in its broadest aspect provides means for causing biocide compositions, having oxidant properties, less

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comburant, viz. less liable to enhance burning of combustible materials. Therefore it is not limited to compositions in which the main active material is TCCA but extends to compositions in which the main active material is another oxidant biocide, or a biocide that is not an oxidant. Examples of such active materials are the sodium salt of dichloro-isocyanuric acid, ~~Calcium hypochlorite~~ calcium hypochlorite, dihalo-dialkylhydantoins (where dihalo means dibromo-, dichloro- or bromochloro-, dialkyl means C1-C5 aliphatic hydrocarbon radical, which can be the same or different), and other halogenated isocyanurates, e.g. dichloro or monochloro acids or their salts.

Detailed Description of Preferred Embodiments

Examples of compositions according to embodiments of the invention wherein TCCA (~~Trichloro~~ trichloro-isocyanuric acid) is the biocide, the boric compound is BA (boric acid), and the silicate is SS (sodium silicate with a $\text{SiO}_2/\text{Na}_2\text{O}$ ratio of 3.22), which also comprise Alum as flocculant, are given in Table I.

Table I

| Mixture # | Parts by weight | | | |
|-----------|-----------------|----|----|------|
| | TCCA | BA | SS | Alum |
| Mixture # | 90 | 5 | 3 | 10 |
| 1 | TCCA | BA | SS | Alum |
| 1 | 98 | 8 | 5 | 18 |
| 2 | 98 | 4 | 3 | 3 |
| 3 | 98 | 4 | 3 | 18 |
| 4 | 98 | 3 | 3 | 3 |
| 5 | 98 | 3 | 2 | 18 |
| 6 | 98 | 3 | 2 | 3 |
| 7 | 98 | 3 | 2 | 18 |
| 8 | 98 | 3 | 2 | 3 |
| 9 | 98 | 3 | 2 | 18 |
| 10 | 98 | 3 | 2 | 3 |
| 11 | 98 | 3 | 2 | 18 |
| 12 | 98 | 3 | 2 | 3 |
| 13 | 98 | 3 | 2 | 18 |
| 14 | 98 | 3 | 2 | 10 |
| 15 | 80 | 5 | 2 | 10 |
| 16 | 100 | | | |

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Table II presents the results of testing of the mixtures of Table I:

Table II

| Sample # | Burning test results | | | | | | | | | |
|----------|----------------------|---------|---------|------------|----------|---------|---------|---------|------------|----------|
| Sample # | Burning | Glowing | Smoking | Flickering | Duration | Burning | Glowing | Smoking | Flickering | Duration |
| 1 | | | + | | 3' | | | ++ | | 1' 30" |
| 2 | | | + | | 3' | | | ++ | | 1' 30" |
| 3 | | | + | | 2' 43" | | | ++ | | 1' 49" |
| 6 | | | + | | 2' 42" | | | ++ | | 1' 38" |
| 7 | | | + | | 2' 48" | | | ++ | | 1' 45" |
| 8 | | | + | | 1' 30" | | | ++ | + | 1' 48" |
| 9 | | | + | | 2' 40" | | | ++ | | 1' 50" |
| 10 | | | ++ | | 1' 40" | | | ++ | | 1' 49" |
| 11 | | | + | | 3' | | | ++ | | 1' 49" |
| 12 | | | ++ | | 3' | | | ++ | | 1' 45" |
| 13 | | | + | | 3' | | | ++ | | 1' 33" |
| 14 | ++ | | ++ | + | 4' | | | ++ | + | 38" |
| 15 | | | + | | 3' | | | ++ | | 1' 25" |
| 16 | ++ | | ++ | | 1' | | | ++ | + | 30" |

The + indicates a positive response. More than one + indicate stronger positive responses. A comparative mixture containing only TCCA burned with flame and a lot of smoke, while mixtures 1, 2 and 7 to 12 burned only for a short time. Mixtures 6, 13 and 15 do not burn or glow. All mixtures developed smoke, some flickered but none visibly glowed.

Similar mixtures of other biocidal materials, such as halogenated dialkylhydantoin, calcium hypochlorite and the sodium salt of dichloroisocyanuric acid, taken in equivalent active halogen proportions, behaved similarly.

The anti-microbial efficacy of the exemplified compositions was tested on *E. coli* #11229, according to a modified AOAC standard method 965.13

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Efficacy for Swimming Pool Disinfection. A chlorine concentration of 0.5 ppm, provided by the formulations, was enough to kill the bacteria in less than 1 minute. TCCA alone was similarly active at said concentration. This shows that the efficacy of the compositions according to the invention was not affected by the presence of the components other than the oxidant.

The compositions can be granulated by a dry or wet process. The granules can be used directly or can be further pressed into bodies, e.g. tablets or briquettes of any desired form, of convenient sizes according to the intended use.

If a soluble sanitizing agent, e.g. Na ~~Dichloro~~dichloro-isocyanurate (NaDCCA), is used in the formulation, the compositions can be used, as granules or bodies, for shock treatment of any body of water requiring it, due to the high solubility of the biocide.

While some embodiments of the invention have been described by way of illustration, it will be apparent that the invention can be carried into practice by persons skilled in the art with many modifications, variations and adaptations, without departing from the spirit of the invention or exceeding the scope of the claims.

MARKED-UP PAGECLAIMS

1. Biocidal compositions, containing biocidal components and mixed with said components a combination of inorganic compounds capable of reducing the oxidative capacity of the biocidal components by forming a low-melting glass when heated.
2. Biocidal composition according to claim 1, wherein the biocidal composition is heated by being ignited or subjected to a heating source.
3. Biocidal composition according to claim 2, wherein the heating source is a fire.
4. Biocidal composition according to claim 1, wherein the biocidal component is an oxidant.
5. Biocidal composition according to claim 4, wherein the oxidant is ~~Trichloroisocyanuric~~ trichloroisocyanuric acid.
6. Biocidal composition according to claim 1, wherein the composition forms a low-melting glass when heated to moderately high temperatures.
7. Biocidal composition according to claim 6, wherein the moderately high temperatures are from 300 to 800°C.
8. Biocidal composition according to claim 1, wherein the combination of inorganic compounds is the combination of boric compounds and alkaline silicates.
9. Biocidal composition according to claim 8, wherein the boric compounds are chosen from among boric acid, borax and sodium tetraborate.

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10. Biocidal composition according to claim 8, wherein the silicates are sodium silicates.

11. Biocidal composition according to claim 8, wherein the silicates are such that the ratio $\text{SiO}_2/\text{Na}_2\text{O}$ is between 2 and 5 and the Na_2O content is between 12-25%.

12. Biocidal composition according to claim 1, wherein the combination of inorganic compounds is such as to produce, when heated, a low-melting, borosilicate glass which coats the oxidant.

13. Biocidal composition according to claim 9, wherein the contents of boric acid or of the molar boric moieties of borates, are from 2 to 15 wt% of the whole composition.

14. Biocidal composition according to claim 13, wherein the contents of boric acid or of the molar boric moieties of borates, are from 10 to 15 wt% of the whole composition.

15. Biocidal composition according to claim 8, wherein the contents of the silicates are from 1 to 10 wt% of the composition.

16. Biocidal composition according to claim 15, wherein the contents of the silicates are from 2 to 8 wt% of the composition.

17. Biocidal composition according to claim 1, further comprising a flocculant.

18. Biocidal composition according to claim 17, wherein the flocculant is aluminum sulfate.

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19. Biocidal composition according to claim 4, wherein the oxidant is chosen from the group consisting of trichloro-isocyanuric acid, calcium hypochlorite, dihalo-dialkyl-hydantoins, halogenated isocyanuric acids and the salts of said acids.

20. Biocidal solid composition according to claim 1, in the form of tablets, briquettes, granules or powder.

21. Use of the composition according to any one of claims 1 to 20 for the sanitation of bodies of water.

22. Use according to claim 21, wherein the bodies of water are chosen from the group consisting of swimming pools, spas, cooling towers, paper industry wastes, toilet bowls, household and I&I bleaches applications.

23. Method for rendering biocide compositions less comburant, which comprises mixing with the biocide a combination of inorganic compounds capable of forming a low-melting glass when heated to moderately high temperatures.

24. Biocidal composition, substantially as described and exemplified.

25. Method for rendering biocide compositions less comburant, substantially as described and exemplified.

MARKED-UP PAGE**Abstract**

Biocidal compositions that contain biocidal components, such as an oxidant, and mixed with said components a combination of inorganic compounds capable of reducing the oxidative capacity of the biocidal components by forming a low-melting glass when heated. The biocidal composition may be heated by being ignited or subjected to a heating source, such as a fire.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL04/00317

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A01N 59/08, 25/00, 43/50, 43/66

US CL : 424/665; 514/241, 385, 386, 769, 770

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 424/665; 514/241, 385, 386, 769, 770

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages. | Relevant to claim No. |
|------------|---|-----------------------|
| X | US 4,731,195 A (OLSON) 15 March 1988 (15.03.1988), see entire reference, especially column 4, lines 16-68, Column 5. | 1-16, 19, 20 |
| --- | | 17, 18, 23 |
| Y | | |
| Y | US 5,478,482 A (JONES et al.) 26 December 1995 (26.12.1995), see entire reference especially column 3, lines 30-68, columns 4-11. | 17, 18, 23 |

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" documents which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"A" document member of the same patent family

Date of the actual completion of the international search

01 October 2004 (01.10.2004)

Date of mailing of the international search report

23 DEC 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Gary Kunz

Telephone No. (571) 272-1600

DEBORAH A. THOMAS
PARALEGAL SPECIALIST

~~GROUP 1800~~ DAT

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL04/00317

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 21 and 22
because they relate to subject matter not required to be searched by this Authority, namely:
"Use" claims are not proper process claims under 35 USC 101.
2. ☒ Claims Nos.: 21,22,24,25
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Please See Continuation Sheet
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL04/00317

Continuation of Box II Reason 2:

Claims 21, 22 are indefinite they merely recites a use without any active, positive steps delimiting how this use is actually practiced.
Claims 24, 25 are indefinite in that they fail to point out what is included or excluded by the claim language.

Continuation of B. FIELDS SEARCHED Item 3:

EAST

search terms: trichloroisocyanuric acid, hypochlorite, hydantoin, boric, borate, tetraborate, borosilicate, silicate, silica, silicon, glass, biocide, alum, aluminum sulfate

PATENT COOPERATION TREATY

PCT

NOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

From the INTERNATIONAL BUREAU

To:

LUZZATTO, Kfir
P.O. Box 5352
84152 Beer Sheva
Israel

| | |
|--|--|
| Date of mailing (day/month/year) 25 May 2004 (25.05.2004) | IMPORTANT NOTIFICATION |
| Applicant's or agent's file reference 16015-WO-03 | |
| International application No. PCT/IL2004/000317 | International filing date (day/month/year) 08 April 2004 (08.04.2004) |
| International publication date (day/month/year) Not yet published | Priority date (day/month/year) 14 April 2003 (14.04.2003) |
| Applicant BROMINE COMPOUNDS LTD. et al | |

- By means of this Form, which replaces any previously issued notification concerning submission or transmittal of priority documents, the applicant is hereby notified of the date of receipt by the International Bureau of the priority document(s) relating to all earlier application(s) whose priority is claimed. Unless otherwise indicated by the letters "NR", in the right-hand column or by an asterisk appearing next to a date of receipt, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
- (If applicable) The letters "NR" appearing in the right-hand column denote a priority document which, on the date of mailing of this Form, had not yet been received by the International Bureau under Rule 17.1(a) or (b). Where, under Rule 17.1(a), the priority document must be submitted by the applicant to the receiving Office or the International Bureau, but the applicant fails to submit the priority document within the applicable time limit under that Rule, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
- (If applicable) An asterisk(*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b) (the priority document was received after the time limit prescribed in Rule 17.1(a) or the request to prepare and transmit the priority document was submitted to the receiving Office after the applicable time limit under Rule 17.1(b)). Even though the priority document was not furnished in compliance with Rule 17.1(a) or (b), the International Bureau will nevertheless transmit a copy of the document to the designated Offices, for their consideration. In case such a copy is not accepted by the designated Office as priority document, Rule 17.1(c) provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

| <u>Priority date</u> | <u>Priority application No.</u> | <u>Country or regional Office or PCT receiving Office</u> | <u>Date of receipt of priority document</u> |
|----------------------------|---------------------------------|---|---|
| 14 April 2003 (14.04.2003) | 155435 | IL | 12 May 2004 (12.05.2004) |

| | |
|---|--|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland | Authorized officer ALI SOLEIMAN |
| Facsimile No. (41-22) 338.71.30 | Telephone No. (41-22) 338 8554 |

PATENT COOPERATION TREATY

WO 2004/089081
PCT/IL2004/000317

From the INTERNATIONAL BUREAU

PCT

SECOND AND SUPPLEMENTARY NOTICE
INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION (TO DESIGNATED OFFICES
WHICH APPLY THE 30 MONTH TIME
LIMIT UNDER ARTICLE 22(1))

(PCT Rule 47.1(c))

To:

LUZZATTO, Kfir
P.O. Box 5352
84152 Beer Sheva
ISRAËL

Date of mailing (day/month/year)
18 August 2005 (18.08.2005)

Applicant's or agent's file reference
16015-WO-03

IMPORTANT NOTICE

International application No.
PCT/IL2004/000317

International filing date (day/month/year)
08 April 2004 (08.04.2004)

Priority date (day/month/year)
14 April 2003 (14.04.2003)

Applicant

BROMINE COMPOUNDS LTD. et al

1. **ATTENTION:** For any designated Office(s), for which the time limit under Article 22(1), as in force from 1 April 2002 (30 months from the priority date), **does not apply**, please see Form PCT/IB/308(First Notice) issued previously.
2. Notice is hereby given that the following designated Office(s), for which the time limit under Article 22(1), as in force from 1 April 2002, **does apply**, has/have requested that the communication of the international application, as provided for in Article 20, be effected under Rule 93bis.1. The International Bureau has effected that communication on the date indicated below:
21 October 2004 (21.10.2004)

AU, AZ, BY, CN, CO, DZ, EP, HU, KG, KP, KR, MD, MK, MZ, NA, RU, SY, TM, US

In accordance with Rule 47.1(c-bis)(i), those Offices will accept the present notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

3. The following designated Offices, for which the time limit under Article 22(1), as in force from 1 April 2002, **does apply**, have not requested, as at the time of mailing of the present notice, that the communication of the international application be effected under Rule 93bis.1:

AE, AG, AL, AM, AP, AT, BA, BB, BG, BR, BW, BZ, CA, CR, CU, CZ, DE, DK, DM, EA, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, ID, IL, IN, IS, JP, KE, KZ, LC, LK, LR, LS, LT, LV, MA, MG, MN, MW, MX, NI, NO, NZ, OA, OM, PG, PH, PL, PT, RO, SC, SD, SG, SK, SL, TJ, TN, TR, TT, UA, UZ, VC, VN, YU, ZA, ZW

In accordance with Rule 47.1(c-bis)(ii), those Offices accept the present notice as conclusive evidence that the Contracting State for which that Office acts as a designated Office does not require the furnishing, under Article 22, by the applicant of a copy of the international application.

4. TIME LIMITS for entry into the national phase

For the designated or elected Office(s) listed above, the applicable time limit for entering the national phase will, subject to what is said in the following paragraph, be **30 MONTHS** from the priority date.

In practice, time limits other than the 30-month time limit will continue to apply, for various periods of time, in respect of certain of the designated or elected Office(s) listed above. For regular updates on the applicable time limits (30 or 31 months, or other time limit), Office by Office, refer to the *PCT Gazette*, the *PCT Newsletter* and the *PCT Applicant's Guide*, Volume II, National Chapters, all available from WIPO's Internet site, at <http://www.wipo.int/pc/en/index.html>.

It is the applicant's sole responsibility to monitor all these time limits.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

Simin Baharlou

Facsimile No.+41 22 740 14 35

Facsimile No.+41 22 338 71 30

PCT REQUEST

Original (for SUBMISSION)

| | | |
|---------|---|--|
| 0 | For receiving Office Use only | |
| 0-1 | International Application No | |
| 0-2 | International Filing Date | |
| 0-3 | Name of receiving Office and "PCT International Application" | |
| 0-4 | Form - PCT/RO/101 PCT Request | |
| 0-4-1 | Prepared Using | PCT-SAFE [EASY mode] Version 3.50 (Build 0002.150) |
| 0-5 | Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty | |
| 0-6 | Receiving Office (specified by the applicant) | Israel Patent Office (RO/IL) |
| 0-7 | Applicant's or agent's file reference | 16015-WO-03 |
| I | Title of invention | SOLID BIOCIDES FORMULATIONS |
| II | Applicant | |
| II-1 | This person is: | applicant only |
| II-2 | Applicant for | all designated States except US |
| II-4 | Name: | BROMINE COMPOUNDS LTD. |
| II-5 | Address: | Makleff House P.O.Box 180 84101 Beer Sheva Israel |
| II-6 | State of nationality | IL |
| II-7 | State of residence | IL |
| III-1 | Applicant and/or inventor | |
| III-1-1 | This person is: | applicant and inventor |
| III-1-2 | Applicant for | US only |
| III-1-4 | Name (LAST, First) | FISHLER, Theodor Morel |
| III-1-5 | Address: | 20 Keren Ha'Yesod Street 34970 Haifa Israel |
| III-1-6 | State of nationality | IL |
| III-1-7 | State of residence | IL |

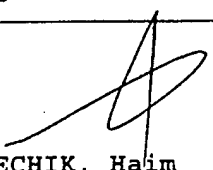
PCT REQUEST

Original (for SUBMISSION)

| | | |
|--------|---|---|
| IV-1 | Agent or common representative; or address for correspondence The person identified below is hereby/ has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: | agent |
| IV-1-1 | Name (LAST, First) | LUZZATTO, Kfir |
| IV-1-2 | Address: | P.O. Box 5352 84152 Beer Sheva Israel |
| IV-1-3 | Telephone No | 972-8-6467070 |
| IV-1-4 | Facsimile No | 972-8-6467080 |
| IV-1-5 | e-mail | MAIL@LUZZATTO.CO.IL |
| IV-2 | Additional agent(s) | additional agent(s) with same address as first named agent |
| IV-2-1 | Name(s) | LUZZATTO, Esther; LUZZATTO, Edgar; HACKMEY, Michal; FUERST, Zadok; CHECHIK, Haim; MANZUROLA, Emanuel; ZRIHAN-LICHT, Sheila; JACOBSON, Zvi-Michael; GUTTMANN, Thomas; ALPERT, Bruce; CROITORO, Boaz; WEISS, Shmuel; SHALEV, Ronit; HACKMEY, Miriam; PALMERY, Amir; MANDLER, Oren; LAVON, Avi |
| V | DESIGNATIONS | |
| V-1 | The filing of this request constitutes under Rule 4.9(a), the designation of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents | |
| VI-1 | Priority claim of earlier national application | |
| VI-1-1 | Filing date | 14 April 2003 (14.04.2003) |
| VI-1-2 | Number | 155435 |
| VI-1-3 | Country | IL |
| VI-2 | Priority document request The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s): | VI-1 |
| VII-1 | International Searching Authority Chosen | United States Patent and Trademark Office (USPTO) (ISA/US) |

PCT REQUEST

Original (for SUBMISSION)

| | | | |
|--------|--|---|------------------------------------|
| VIII | Declarations | Number of declarations | |
| VIII-1 | Declaration as to the identity of the inventor | - | |
| VIII-2 | Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent | - | |
| VIII-3 | Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application | - | |
| VIII-4 | Declaration of inventorship (only for the purposes of the designation of the United States of America) | - | |
| VIII-5 | Declaration as to non-prejudicial disclosures or exceptions to lack of novelty | - | |
| IX | Check list | number of sheets | electronic file(s) attached |
| IX-1 | Request (including declaration sheets) | 4 | - |
| IX-2 | Description | 7 | - |
| IX-3 | Claims | 3 | - |
| IX-4 | Abstract | 1 | ✓ |
| IX-5 | Drawings | 0 | - |
| IX-7 | TOTAL | 15 | |
| | Accompanying Items | paper document(s) attached | electronic file(s) attached |
| IX-8 | Fee calculation sheet | ✓ | - |
| IX-9 | Original separate power of attorney | ✓ | - |
| IX-11 | Copy of general power of attorney | reference no. PCT/ IL03/01005 | - |
| IX-17 | PCT-SAFE physical media | - | ✓ |
| IX-19 | Figure of the drawings which should accompany the abstract | | |
| IX-20 | Language of filing of the international application | English | |
| X-1 | Signature of applicant, agent or common representative |  CHECHIK, Haim | |
| X-1-1 | Name: | | |
| X-1-2 | Name of signatory | | |
| X-1-3 | Capacity | | |

PCT REQUEST

Original (for SUBMISSION)

FOR RECEIVING OFFICE USE ONLY

| | | |
|--------|---|--------|
| 10-1 | Date of actual receipt of the purported international application | |
| 10-2 | Drawings: | |
| 10-2-1 | Received | |
| 10-2-2 | Not received | |
| 10-3 | Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application | |
| 10-4 | Date of timely receipt of the required corrections under PCT Article 11(2) | |
| 10-5 | International Searching Authority | ISA/US |
| 10-6 | Transmittal of search copy delayed until search fee is paid | |

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| 11-1 | Date of receipt of the record copy by the International Bureau | |
|------|--|--|

Declaration And Power of Attorney For Patent Application

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SOLID BIOCIDES FORMULATIONS
(Title)

the specification of which (check one)

- ☒ is attached hereto.
was filed on October 7, 2005 as U.S. Patent Application Serial number _____, which claims priority to (a) International Application: PCT/IL2004/000317, filed on April 8, 2004, and (b) Israeli Patent Application Number 155435 filed on April 14, 2003.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56, and understand that this duty is continuous until this application matures into a patent.

I hereby claim foreign priority benefits under Title 25, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Israeli Patent Application Number 155435 filed on April 14, 2003

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below: **NONE**

I hereby claim the benefit under 35 U.S.C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112. I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C.F.R. Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

International Application: PCT/IL2004/000317, filed on April 8, 2004, (pending)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity or the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

Kevin D. McCarthy (Reg. No. 35,278)

Send Correspondence to: **Kevin D. McCarthy, Esq.**
Roach Brown McCarthy & Gruber, P.C.
1620 Liberty Building
Buffalo, New York 14202

Direct Telephone Calls to: (name and telephone number)
Kevin D. McCarthy: (716) 852-0400 and
email: kdmccarthy@roachbrown.com

Inventor Information: -

Full Name of First Inventor: Theodor Morel Fishler

Inventor's Signature: _____ Date: _____

Residence: 20 Keren Ha'Yesod Street, 34970 Haifa, Israel

Citizenship: Israeli

Post Office Address: 20 Keren Ha'Yesod Street, 34970 Haifa, Israel

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I hereby confirm that I, Kevin D., McCarthy, have deposited this correspondence along with other documents with the U.S. Postal Service by express mail on October 7, 2005. The express mail label is no. ER 573628078 US

Kevin D. McCarthy

Date 10/7/05

Patent 0-05-165/16015/US/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Fishler
Serial no.: N/A
Filed: Herewith
Title: SOLID BIOCIDES FORMULATIONS
Examiner: N/A
Art Unit: N/A

Mail Stop PCT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

INFORMATION DISCLOSURE STATEMENT

Applicant submits the enclosed information disclosure statement that is being filed herewith with the original nationalization of this PCT application. Accordingly, it is applicant's opinion that the examiner at the U.S. Patent and Trademark Office should consider these references in determining the patentability of this application.

If Applicant becomes aware of other relevant references that are not cumulative of the submitted references, Applicant will submit them.

Respectfully submitted


Kevin D. McCarthy

Reg. No. 35,278

Roach, Brown, McCarthy & Gruber, P.C.
1620 Liberty Building - 420 Main Street
Buffalo, New York 14202

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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known

| | |
|------------------------|----------|
| Application Number | N/A |
| Filing Date | Herewith |
| First Named Inventor | Fishler |
| Art Unit | N/A |
| Examiner Name | N/A |
| Attorney Docket Number | 0-05-165 |

| | | | |
|-------|---|----|---|
| Sheet | 1 | of | 2 |
|-------|---|----|---|

U. S. PATENT DOCUMENTS

[illegible]

FOREIGN PATENT DOCUMENTS

[illegible]

| | | | |
|-----------------------|--|--------------------|--|
| Examiner Signature | | Date Considered | |
|-----------------------|--|--------------------|--|

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This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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|---|------|--------------------------|----------|
| Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary) | | Complete if Known | |
| | | Application Number | N/A |
| | | Filing Date | Herewith |
| | | First Named Inventor | Fishler |
| | | Art Unit | N/A |
| | | Examiner Name | N/A |
| Sheet 2 | of 2 | Attorney Docket Number | 0-05-165 |

| NON PATENT LITERATURE DOCUMENTS | | | |
|---------------------------------|-----------------------|---|----------------|
| Examiner Initials* | Cite No. ¹ | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published. | T ² |
| | 3 | International Search Report for corresponding PCT application - 3 pages | |
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|--------------------|--|-----------------|--|
| Examiner Signature | | Date Considered | |
|--------------------|--|-----------------|--|

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¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

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1. Name of conveying party(ies)

Theodor Morel Fishler

Additional name(s) of conveying party(ies) attached? ☐ Yes ☒ No

3. Nature of conveyance/Execution Date(s):

Execution Date(s) 5-29-2004

- ☒ Assignment ☐ Merger
☐ Security Agreement ☐ Change of Name
☐ Joint Research Agreement
☐ Government Interest Assignment
☐ Executive Order 9424, Confirmatory License
☐ Other _____

2. Name and address of receiving party(ies)

Name: Bromine Compounds Ltd.

Internal Address: _____

Street Address: _____

Makleff House, P.O. Box 180

City: Beer Sheva

State: _____

Country: Israel Zip: 84101

Additional name(s) & address(es) attached? ☐ Yes ☒ No

4. Application or patent number(s):

☒ This document is being filed together with a new application.

A. Patent Application No.(s)

B. Patent No.(s)

Additional numbers attached? ☐ Yes ☐ No

5. Name and address to whom correspondence concerning document should be mailed:

Name: Kevin D. McCarthy

Internal Address: _____

Roach Brown McCarthy & Gruber, P.C.

Street Address: _____

420 Main Street - 1620 Liberty Building

City: Buffalo

State: New York Zip: 14202

Phone Number: 716-852-0400

Fax Number: 716-852-2535

Email Address: kdmccarthy@roachbrown.com

6. Total number of applications and patents involved: 1

7. Total fee (37 CFR 1.21(h) & 3.41) \$ 40

- ☐ Authorized to be charged by credit card
☐ Authorized to be charged to deposit account
☒ Enclosed
☐ None required (government interest not affecting title)

8. Payment Information

a. Credit Card Last 4 Numbers _____
Expiration Date _____

b. Deposit Account Number _____

Authorized User Name _____

9. Signature:


Signature

10/7/2005
Date

Kevin D. McCarthy
Name of Person Signing

Total number of pages including cover sheet, attachments, and documents:

2

(16015/03)

ASSIGNMENT

WHEREAS, I

1) Theodor Morel Fishler, an Israeli citizen residing at 20 Keren Ha'Yesod Street, Haifa 34970, Israel

hereinafter referred to as Assignors, have made an invention entitled

SOLID BIOCIDES FORMULATIONS

For which Israeli Patent Application No. 155435 was filed on April 14, 2003; and

WHEREAS, Bromine Compounds Ltd., an Israeli company of Makleff House, P.O. Box 180, Beer Sheva 84101, hereinafter referred to as Assignee, is desirous of acquiring all right, title and interest in and to said invention and the aforementioned patent application and any patent that may be granted therefor.

NOW, THEREFORE, in consideration of One New Israeli Shekel (NS 1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged, We, as Assignors, hereby sell, assign and set over to said Assignee the entire right, title and interest for Israel and all other countries of the world in and to said invention and the aforesaid patent application, and all original, divisional or other applications and patents applied for or granted therefor in Israel and in any other country, including an international patent application which will be filed under the PCT and all national/regional phase applications derived from said international application, including all US national derivatives, and all patents which may be granted thereon, and the undersigned for ourselves and our legal representatives, heirs and assigns do hereby agree and covenant without further remuneration, to execute and deliver all documents required for transferring said patents/applications to said Assignee or its assigns, to communicate to said Assignee or its representatives all facts known to the undersigned with respect to said patents/applications, whenever requested, to testify in any legal proceedings in which the said patents or patent applications may become involved, to sign all lawful papers, make all rightful oaths, and to do generally everything necessary to aid said Assignee, its successors, assigns and nominees to register the assignment of the said Patent(s) or Patent Application(s), the expenses incident to said application to be borne and paid by said assignee. This Deed of Assignment does not detract from any other assignment previously made in respect of the same matters, if any.

29.05.2004

Date



Theodor Morel Fishler

David Feldman

Witness

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Kevin D. McCarthy

Date 10/7/05

Patent 0-05-165/16015/US/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Fishler
Serial no.: N/A
Filed: Herewith
Title: SOLID BIOCIDES FORMULATIONS
Examiner: N/A
Art Unit: N/A

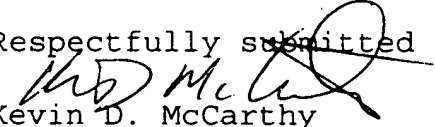
Mail Stop PCT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

Preliminary Amendment

This preliminary amendment is being submitted to present the claims in U.S. format instead of the European type format that can be found in the original submission. Applicant has not altered the scope or breadth of these claims. These claims start at page 2 of this document.

Respectfully submitted


Kevin D. McCarthy

Reg. No. 35,278

Roach, Brown, McCarthy & Gruber, P.C.
1620 Liberty Building - 420 Main Street
Buffalo, New York 14202

1. (Original) Biocidal compositions, containing biocidal components and mixed with said components a combination of inorganic compounds capable of reducing the oxidative capacity of the biocidal components by forming a low-melting glass when heated.

2. (Original) Biocidal composition according to claim 1, wherein the biocidal composition is heated by being ignited or subjected to a heating source.

3. (Original) Biocidal composition according to claim 2, wherein the heating source is a fire.

4. (Original) Biocidal composition according to claim 1, wherein the biocidal component is an oxidant.

5. (Original) Biocidal composition according to claim 4, wherein the oxidant is trichloroisocyanuric acid.

6. (Original) Biocidal composition according to claim 1, wherein the composition forms a low-melting glass when heated to moderately high temperatures.

7. (Original) Biocidal composition according to claim 6, wherein the moderately high temperatures are from 300 to 800°C.

8. (Original) Biocidal composition according to claim 1, wherein the combination of inorganic compounds is the combination of boric compounds and alkaline silicates.

9. (Original) Biocidal composition according to claim 8, wherein the boric compounds are chosen from among boric acid, borax and sodium tetraborate.

10. (Original) Biocidal composition according to claim 8, wherein the silicates are sodium silicates.

11. (Original) Biocidal composition according to claim 8, wherein the silicates are such that the ratio $\text{SiO}_2/\text{Na}_2\text{O}$ is between 2 and 5 and the Na_2O content is between 12-25%.

12. (Original) Biocidal composition according to claim 1, wherein the combination of inorganic compounds is such as to produce, when heated, a low-melting, borosilicate glass which coats the oxidant.

13. (Original) Biocidal composition according to claim 9, wherein the contents of boric acid or of the molar boric moieties of borates, are from 2 to 15 wt% of the whole composition.

14. (Original) Biocidal composition according to claim 13, wherein the contents of boric acid or of the molar boric moieties of borates, are from 10 to 15 wt% of the whole composition.

15. (Original) Biocidal composition according to claim 8, wherein the contents of the silicates are from 1 to 10 wt% of the composition.

16. (Original) Biocidal composition according to claim 15, wherein the contents of the silicates are from 2 to 8 wt% of the composition.

17. (Original) Biocidal composition according to claim 1, further comprising a flocculant.

18. (Original) Biocidal composition according to claim 17, wherein the flocculant is aluminum sulfate.

19. (Original) Biocidal composition according to claim 4, wherein the oxidant is chosen from the group consisting of trichloro-isocyanuric acid, calcium hypochlorite, dihalo-dialkyl-hydantoins, halogenated isocyanuric acids and the salts of said acids.

20. (Original) Biocidal solid composition according to claim 1, in the form of tablets, briquettes, granules or powder.

21. (Currently Amended) Use of a biocidal compositions containing biocidal components and mixed with said components a combination of inorganic compounds capable of reducing the oxidative capacity of the biocidal components by forming a low-melting glass when heated, the composition according to any one of claims 1 to 20 for the sanitation of bodies of water.

22. (Original) Use according to claim 21, wherein the bodies of water are chosen from the group consisting of swimming pools, spas, cooling towers, paper industry wastes, toilet bowls, household and I&I bleaches applications.

23. (Original) Method for rendering biocide compositions less comburant, which comprises mixing with the biocide a combination of inorganic compounds capable of forming a low-melting glass when heated to moderately high temperatures.

24. (Canceled) ~~Biocidal composition, substantially as described and exemplified.~~

25. (Canceled) ~~Method for rendering biocide compositions less
comburent, substantially as described and exemplified.~~

U. S. Patent and Trademark Office

| | |
|---------------------------------|----------------------------|
| Inventor: | Fishler |
| Title: | Solid Biocide Formulations |
| Filing Date: | Herewith |
| Transmittal Letter: | (3 pages) |
| International Application (A2): | (10 pages) |
| International Application (A3): | (4 pages) |
| Clean document: | (13 pages) |
| Amendments to Claims: | (11 pages) |
| Declaration (unsigned): | (2 pages) |
| IDS: | (6 pages) |
| Assignment papers: | (2 pages) |
| Preliminary Amendment: | (5 pages) |
| Form 304: | (1 page) |
| Form 308: | (1 page) |
| PCT Request: | (4 pages) |
| Our Ref. No.: | 0-05-165 |
| Postcard: | Stamped, self-addressed |
| Check: | \$690 |

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& GRUBER, P.C.
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BUFFALO, NY 14202

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U. S. Patent and Trademark Office

| | |
|---------------------------------|----------------------------|
| Inventor: | Fishler |
| Title: | Solid Biocide Formulations |
| Filing Date: | Herewith |
| Transmittal Letter: | (3 pages) |
| International Application (A2): | (10 pages) |
| International Application (A3): | (4 pages) |
| Clean document: | (13 pages) |
| Amendments to Claims: | (11 pages) |
| Declaration (unsigned): | (2 pages) |
| IDS: | (6 pages) |
| Assignment papers: | (2 pages) |
| Preliminary Amendment: | (5 pages) |
| Form 304: | (1 page) |
| Form 308: | (1 page) |
| PCT Request: | (4 pages) |

10/552377

| | |
|---------------|-------------------------|
| Our Ref. No.: | 0-05-165 |
| Postcard: | Stamped, self-addressed |
| Check: | \$690 |

Message

Kevin D. McCarthy

From: Kevin D. McCarthy [kdmccarthy@roachbrown.com]
Sent: Monday, October 31, 2005 11:45 AM
To: 'Haim Chechik (L&L)'
Subject: Your ref: 16015/US/03; Our ref: 0-05-165

Dear Mr. Chechik:

We received the return postcard from the USPTO. The USPTO confirms the application was filed on October 7, 2005, and indicates the serial number will be 10/552,377.

In response to this information, we prepared the attached declaration for the inventor to execute. The inventor need not execute an assignment because the assignment was previously executed and submitted. We look forward to receiving the executed declaration as soon as possible so we can file that document with the USPTO upon receipt of the missing parts document.

If you have any questions, please advise.

Kevin D. McCarthy
Roach Brown McCarthy & Gruber, P.C.
420 Main Street - 1620 Liberty Building
Buffalo, New York 14202
Phone 716-852-0400
Fax 716-852-2535
E-mail kdmccarthy@roachbrown.com

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10/31/2005

Kevin D. McCarthy

From: Kevin D. McCarthy [kdmccarthy@roachbrown.com]
Sent: Tuesday, November 29, 2005 8:07 AM
To: 'Cynthia Field (L&L)'
Subject: RE: Your Ref: 0-05-165 Our Ref: 16015/US/03

Dear Ms. Field:

We will file the executed declaration with the IDS for the IPRP when we receive the notice of missing requirements document from the USPTO.

Thank you and if you have any questions, please advise.

Kevin D. McCarthy
Roach Brown McCarthy & Gruber, P.C.
420 Main Street - 1620 Liberty Building
Buffalo, New York 14202
Phone 716-852-0400
Fax 716-852-2535
E-mail kdmccarthy@roachbrown.com

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-----Original Message-----

From: Cynthia Field (L&L) [mailto:cynthiaf@luzzatto.co.il]
Sent: Tuesday, November 29, 2005 4:43 AM
To: kdmccarthy@roachbrown.com
Subject: Your Ref: 0-05-165 Our Ref: 16015/US/03

Dear Mr. McCarthy:

Re: U.S. Patent Application Serial No. 10/552,377
Inventor: Theodor Morel Fishler

With reference to the above-identified patent application, attached please find the duly executed Declaration and Power of Attorney document, to be filed accordingly.

Kindly acknowledge receipt.

Yours sincerely,

Cynthia Field

Foreign Filing Department
Luzzatto & Luzzatto
Tel: +972-8-646 7070
Fax: +972-8-646 7080
Email: cynthiaf@luzzatto.co.il
<http://www.luzzatto.co.il>

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